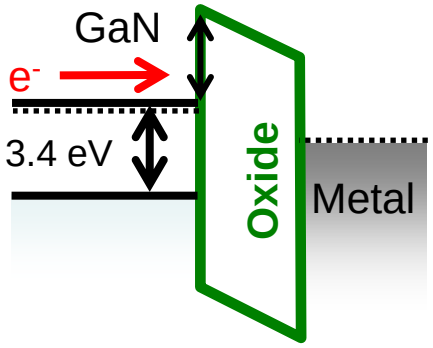


Reliable High-Performance Gate Oxides for Wide Band Gap Devices

Jon Ihlefeld,[1] Elizabeth Paisley,[1] Michael Brumbach,[1] Adam Morgan,[1,2] Christopher Shelton,[2] Robert Kaplar,[1] Andrew Allerman,[1] Christina Rost,[2] Jon-Paul Maria,[2] and Stanley Atcitty[1]

[1]Sandia National Laboratories

[2]North Carolina State University

jihlefe@sandia.gov

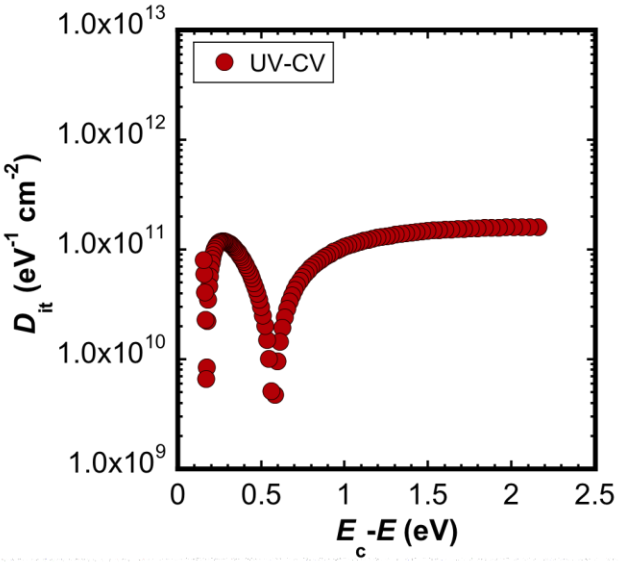
satcitt@sandia.gov

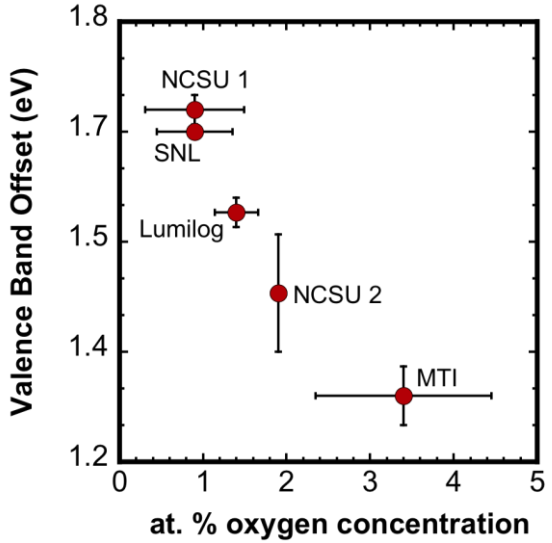
Sandia National Laboratories

Exceptional service in the national interest

Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND2016-9325 C

Reliable Wide Band Gap Gate Dielectrics





Purpose

- Gate dielectrics are a key limiter in GaN- and SiC-based power electronics technology
- Engineered gates will enable the development of robust and reliable MOSFETs and MOSHEMTs

Results

- Measured and verified low interface state densities in MgO/GaN structures
  - Among lowest (best) reported for a dielectric/GaN interface
- Identified GaN composition variability leading to device variability

Impact

- Increased System Performance, Efficiency, and Reliability
- Reduced System Cost
- Reduced Power Electronics Size